Open versus minimally invasive surgery for patients with spinal metastases—which one should I choose for my patients?

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Recent new treatment modalities, such as immunotherapy, radiosurgery, early diagnosis, improvement in systemic therapies, among others, are improving life expectancy and quality of life of oncological patients (1,2). Most of the patients with cancer will develop metastases; especially when considering a prolonged survives when compared with some decades ago (1-3). Metastases may affect any organ, but are more common in the lungs, liver and the bones. When considering the bones, the vast majority of them occur in the spine, with an incidence of up to 40% of patients with cancer at some point of the disease (1-3). Spinal metastases are managed with a multidisciplinary team, considering the histological type of cancer, patients' clinical condition, the presence of instability and neurological symptoms, among other factors (1-3).

Surgical treatment of spinal metastases is palliative, once total resection does not result in cure. In this setting, surgery is generally indicated for patients with a good clinical condition (at least three months of life expectancy is generally advocated), with neurological compression or instability, objecting spine stability, neurological recovery, improvement of quality of life and pain control (1-3).

Recently, Hansen-Algenstaedt *et al.* reported the results of a prospective score-matched study with 60 patients with spinal metastases that had surgical treatment (4). Thirty patients had minimally invasive surgery (MIS) and 30 had conventional open procedures.

Conventional open surgery was based on a posterior midline incision and paravertebral muscle dissection, performing decompression and free hand insertion of pedicle screws. On the other hand, MIS surgery was based on percutaneous pedicle screws placement and decompression using three different techniques: (I) tube-like retractor for unilateral posterior decompression; (II) a midline incision of about 4–5 cm for cases with 180° compression from the posterior and for cases with anterior spinal cord compression; (III) pedicle resection extending the laminectomy. Finally, when a body replacement was indicated, it was performed thoracoscopically from T4 to L1 and using an XLIF from L2 to L4.

Indications for surgery were: instability, compression of neural elements, progressive deformity secondary to fractures and axial pain not responding to conservative treatment. Patients requiring cervical spine surgery were excluded. A propensity score match was used with a match tolerance of 0.02, considering the covariate age, tumor type, Tokuhashi score and Tomita score. After that, there were no significant differences in the demographic preoperative parameters between both groups.

They reported that both groups had significant improvements in the visual analogue scale for pain, neurological status, Karnofsky scores and Eastern Cooperative Oncology Group postoperatively. However, there was no difference comparing MIS versus open surgery. Interestingly, MIS group had more instrumented segments (5.5±3.1) compared with open group (3.8±1.7) (P=0.012). Open group had longer decompressed segments (1.8±0.8) compared with MIS patients (1±1) (P=0.001) and more blood loss (2,062.1±1,148 *vs.* 1,156±572.3 mL in the MIS group) (P<0.001).

Transfusions were required in 76.7% of patients with open

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surgery, compared with 40% of those who had MIS (0.006). Open surgery had a longer hospital hospitalization (21.1±10.8 days) compared with MIS patients (11±5 days) (P<0.001).

The MIS surgery group had longer fluoroscopy time (116.1±63.3 s) compared with the open group (69.9±42.6 s) (P=0.002).

Of note, there were no differences about the complication rates between the two groups (P=0.529), but there three cases of infections in the open surgery group versus none in the MIS group.

They concluded that the results of both techniques were comparable with similar outcomes, but MIS group had less blood loss and shorter hospital stay.

This paper needs some additional comments:

(I) As general conclusions, less soft tissue dissection with MIS may decrease blood loss and transfusions, as well as shortening hospital stay, which may be important for this fragile population of patients with cancer;

(II) MIS had longer length of instrumentation—this was attributed to multilevel cancer involvement in the MIS group and the patients may not be surgically treated if open surgery was the only treatment option;

(III) Although MIS seems the best option with many advantages, it should be important to mention that the learning curve may influence the results, especially in smaller hospitals, as well as the higher rate of radiation that surgeons are exposed when performed MIS procedures (5). In the future, computed tomography scan navigation may decrease the radiation exposition by decreasing the use of intraoperative fluoroscopy (6,7);

(IV) Finally, MIS techniques are more expansive than open conventional surgery. Although they may be more cost-effective, once they decrease hospital costs and transfusions, in poor countries, the costs of MIS technologies may be prohibitive for population use.

Authors must be congratulated for this outstanding paper, which must be commended for all spine surgeons. Incorporate some less invasive techniques in the armamentarium of spine surgeons, such as percutaneous screws fixation, are interesting for spinal metastases cases. Finally, a randomized controlled trial should be designed to clarify if MIS techniques may be superior to conventional surgery in the surgical treatment of spinal metastases.

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Footnote

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